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Lake Towerrining Waterbirds

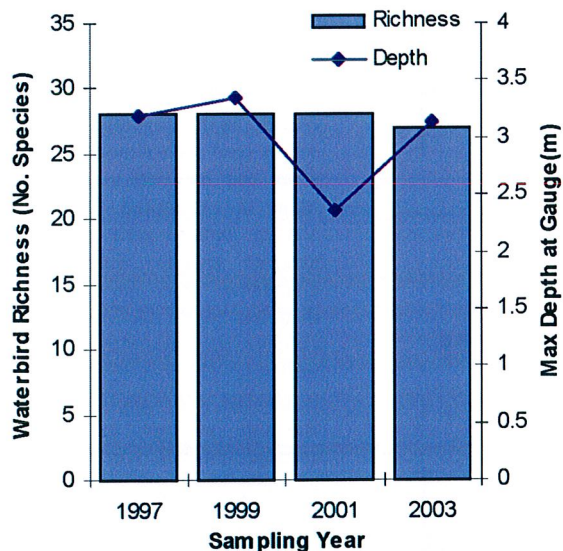
Following clearing of the catchment in the 1960s water quality at Lake Towerrining declined from fresh to brackish. The number of habitats present has also declined as initially, fringing sedges were almost completely lost and then, extensive beds of submergent macrophyte were lost. More recently increased water levels and flushing as a result of modification of the lake's outflow have seen a reduction in water salinity. The lake has had a depth of 2m or more since monitoring began.



Lake Towerrining has relatively stable water depth. (photo by S.A.Halse)

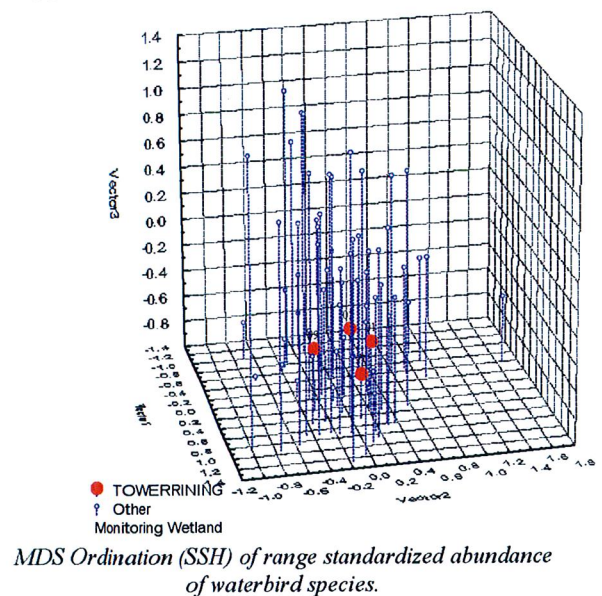
Species Richness

A total of 37 species were recorded with 27 or 28 recorded each year. Seventeen species of waterbird (46%) were recorded in all years. The lake was important for Hardhead in 1997 with 849 recorded in August and 796 in October. Blue-billed Duck were also observed in large numbers with up to 308 individuals recorded in a single survey. Freckled Duck, a relatively uncommon species, were observed in all years except 1999.



Species richness at Lake Towerrining

The waterbird assemblage at Lake Towerrining is stable from year to year. This similarity is reflected in an ordination of waterbird species abundance. Samples from all years lie quite close together and there is no suggestion of a trend through time.



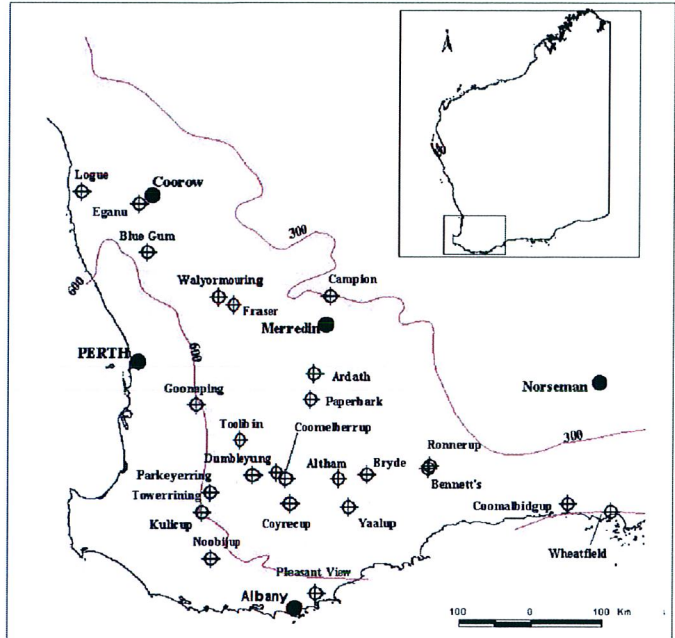
Further Reading

- Cale, D.J., S.A.Halse and C.D.Walker (2004) Wetland monitoring in the Wheatbelt of Western Australia: site descriptions, waterbird, aquatic invertebrate and groundwater data. *Conservation Science W. Aust* 5: 20-13
- Halse, S.A., D.J. Cale, E.J. Jasinska and R.J. Shiel (2002) Monitoring change in aquatic invertebrate biodiversity: sample size, faunal elements and analytical methods. *Aquatic Ecology* 36:1-16
- Jaensch, R.P., R.M. Vervest and M.J. Hewish (1988) Waterbird surveys of wetland nature reserves in south-western Australia: 1981-85. Report No. 30, Royal Australasian Ornithologists Union, Melb.

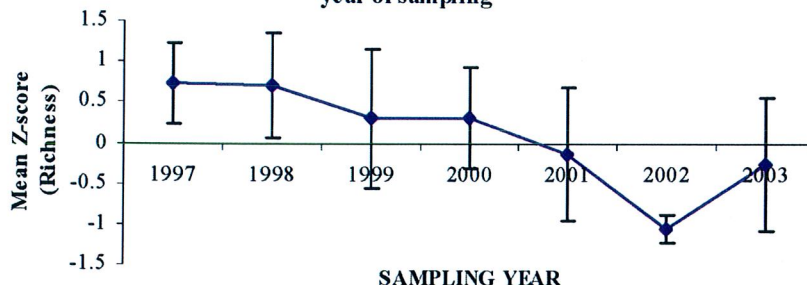
Salinity Action Plan Wheatbelt Wetlands Monitoring Programme

Wheatbelt Wetlands Monitoring

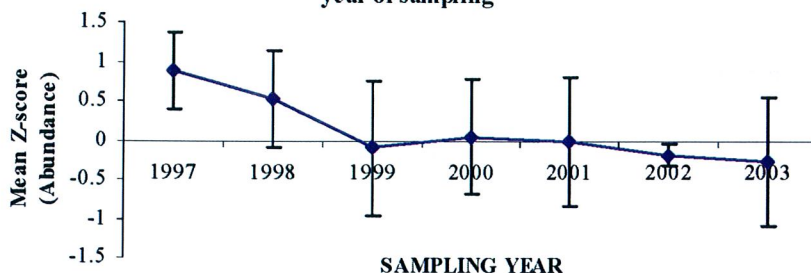
The Salinity action Plan Wheatbelt Wetlands Monitoring programme commenced in 1997 with the sampling of five wetlands and was expanded to include 13 in 1998 and finally a total of 25 wetlands in 1999. These monitoring wetlands have been sampled every second year since commencement, such that half of the wetlands are sampled in alternating years. Wetlands first sampled in 1997 have now been sampled 4 times. While this actually yields few data points and interpretation is, at this stage, imprecise it is expected that as the project continues and further data points are collected an increasingly accurate estimate of wetland trends will be achieved. Faunal sampling includes; waterbird species richness and abundance, aquatic invertebrate species richness and abundance and water-chemistry. Sampling of these parameters is directed toward tracking trends in biodiversity of the wetlands individually and as a group to reflect the status of wheatbelt wetlands generally. This brief note presents data for waterbird surveys up to 2003 and is intended as an annual mechanism for reporting data from this project.



MEAN Z-score for WATERBIRD RICHNESS at all lakes during year of sampling



MEAN Z-score for WATERBIRD ABUNDANCE at all lakes during year of sampling



Waterbird Richness and Abundance in the Wheatbelt

The number of species present (Richness), is a valuable measure of biodiversity and abundance is indicative of the productivity of wetlands. The mean z-score for waterbird richness and abundance is calculated in the same way. At each wetland the normal deviate (z) is calculated for each year, from the entire dataset for that wetland. The mean z-score is the average of these annual z scores over all wetlands. Thus, the mean z-score can be used to measure the overall trend in monitored wetlands over time. Values below zero reflect lower than average species richness or waterbird abundance. Over the period of monitoring there has been a decline in waterbird species richness and abundance at the monitored wetlands. This has coincided with a decline in rainfall following 1999 with 2000-2002 showing 'average' to 'very much below average' rainfall over the study area. It is too early to ascribe the reduction in species richness and abundance to low rainfall, although it is intuitive that the lower water levels and higher salinities associated with low rainfall are likely to lead to fewer species using wetlands.